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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/218,816 12/22/98 JOHNSON

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EXAMINER

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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No. 09/218,816	Applicant(s) Johnson et al.
Examiner Matthew Gerike	Group Art Unit 2879

Responsive to communication(s) filed on Dec 22, 1998

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

Claim(s) 1-43 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

Claim(s) 1-43 is/are rejected.

Claim(s) _____ is/are objected to.

Claims _____ are subject to restriction or election requirement.

Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) _____.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). 2 & 3

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The examiner suggests, --LED with reflector and UV Bragg Mirror--.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The use of the phrase "corresponds" found on page 15, line 2 of claim 11, of the application is considered vague and indefinite.

Claims 12-16 have been necessarily rejected due to their dependency upon claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 7, 18-20 & 23-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Shakuda (U.S. 5,557,115).

Shakuda discloses a light emitting device (chip, figure 8) comprising a phosphor layer (light emitting layer 5) having two opposing sides including one or more excitable, light emitting phosphors (InGaN emitting layer, #5, column 4, lines 25-32) a radiation source (laminate 7) positioned adjacent a first one of the two opposing sides of the phosphor layer for providing radiation to excite a light emission from the phosphor layer, the radiation source having a first contact region (electrode 10) and a second contact region (electrode 9) and reflector means (Au-Sn electrode 10) provided adjacent a second one of the two opposing sides of the phosphor layer for reflecting at least some of the radiation and light emission that exits from the phosphor layer back into the phosphor layer as specifically recited in claim 1. Wherein the reflector means (Au-Sn electrode, 10) comprises a first contact layer (metal layer 22) positioned over at least part of the phosphor layer, the first contact layer being at least partially reflective (Au-Sn is a reflective alloy) and at least partially electrically conductive (as all electrodes are) the first contact layer being electrically connected to the first contact region (bore 20) as recited in claim 2. Wherein a second contact layer (Au-Sn, 21) is electrically connected to the second contact region as recited in claim 3.

Shakuda discloses a visible light emitting device (figure 8, chip) comprising a transparent substrate (substrate 3) a phosphor layer (light emitting layer, InGaN:Zn) including one or more excitable, visible light emitting phosphors (InGaN:Zn) a radiation

source (laminate 7) positioned between the transparent substrate and the phosphor layer for providing a radiation to excite visible light emission from the phosphor layer, the radiation source having a first contact region (Au-Sn electrode, 10) and a second contact region (Au-Sn electrode, 21 or 22), a first contact layer (10) provided over at least part of the phosphor layer and reflecting (Au-Sn alloys are shiny) at least some of the radiation that travels through the phosphor layer back into the phosphor layer, the first contact layer being electrically (via bore 20) connected to the first contact region, and a second contact layer being electrically connected (via bore 19) to the second contact region as specifically recited in claim 4. Wherein the phosphor layer includes one UV excitable (InGaN:Zn) visible light emitting phosphors, and the radiation source is a UV radiation source emitting UV radiation as recited in claim 5.

Shakuda discloses a device wherein the radiation source (laminate 7) has a top surface, one or more side walls, and a lower portion (N-GaN layer) that extends laterally outward from the one or more side walls, the phosphor layer being positioned between at least part of the top surface of the radiation source and the first contact layer (electrode 10) as recited in claim 7.

Shakuda discloses a device wherein the radiation source is a GaN based light emitting diode (see figure 9) as recited in claim 18.

Shakuda discloses a device wherein the transparent substrate is formed from sapphire (sapphire substrate 3) as recited in claim 19.

Shakuda discloses a device wherein one or more excitable, visible light emitting phosphors, (InGaN:Zn) produces a visible light emission having a color that is selected from the group consisting of red, green and blue as recited in claim 20. Shakuda's device emits blue light.

Shakuda discloses a light emitting device comprising a radiation source (laminate 7) having a first contact region (area of 22 & 10) and a second contact region (area of 21 & 9) the radiation source having a top surface and one or more side walls, a phosphor layer (InGaN:Zn) provided adjacent to at least a portion of the one or more side walls of the radiation source, the phosphor layer including one excitable, light emitting phosphors (InGaN:Zn produces blue light and UV) that produce a light emission when exited by radiation as specifically recited in claim 23. Wherein a transparent substrate (substrate 3) is positioned below the radiation source, a first contact layer (electrode 10) for providing an electrical connection to the first contact region of the radiation source and a second contact layer (electrode 21) for providing an electrical contact to the second contact region of the radiation source as recited in claim 24. Wherein the phosphor layer includes one or more UV excitable, visible light emitting phosphors, and the radiation source is a UV radiation source as recited in claim 25. Wherein the radiation source has a bottom portion that has a first conductivity (P type or N type) a top portion has a second conductivity (N type or P type, respectively) and an active region therebetween (InGaN) as recited in claim 26. Wherein the bottom portion has a larger base region (N-GaN) and an upper column

region (N-GaN layer has an elevated median, see figure 8) defining a lower portion of the side walls of the radiation source as recited in claim 27. Wherein the top portion (P-GaN layer) of the radiation source defines an upper portion of the side walls of the radiation source as recited in claim 28.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6, 8-17, 21, 22, 29-39 & 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shakuda (U.S. 5,557,115) as applied to claims 4 and 5 above in view of common knowledge in the art.

Shakuda discloses all the elements of claim 6 including a UV mirror (filter F1, F2 column 4, lines 34-50) being at least partially transparent to visible light, yet fails to disclose an emitting device wherein the UV mirror is positioned between the UV source and the transparent substrate.

The examiner takes Official Notice that it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the UV filter of Shakuda between the substrate and the UV source, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

With respect to claim 8, Shakuda discloses a device wherein the first contact layer extends over at least part of the top surface of the radiation source yet fails to disclose a first contact layer that extends down at least part of the side walls of the radiation source. The examiner takes Official Notice that it would have been obvious to one having ordinary skill in the art at the time the invention was made to extend the contact layer down at least part of the sides of the radiation source since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Shakuda discloses a device wherein the radiation source includes a first portion that is of a first conductivity type (P type) and a second portion that is of a second conductivity type (N type) with an active region therebetween (InGaN:Zn) as recited in claim 9.

Shakuda discloses a device wherein the first portion (P type) of the radiation source is at least partially in the region defined by the top surface and the one or more side walls of the radiation source (see figure 8) and the second portion (N type) is at

least partially in the lower portion of the radiation source that extends laterally outward from the one or more side walls as recited in claim 10.

Shakuda discloses a device wherein the second portion of the radiation source (laminate 7) corresponds to the second contact region (electrode 9) see figure 8, as recited in claim 11.

Shakuda discloses a device wherein the phosphor layer (InGaN:Zn) and the first contact layer (electrode 10) do not overlap the second portion of the radiation source in an open region (area 21, figure 9) the second contact layer making an electrical connection to the second portion of the radiation source in the open region (see figures 8 & 9) as recited in claim 12.

Shakuda discloses a device wherein the phosphor layer is an elongate phosphor strip (under area 22 in figure 9) having a length and a width, the length of the phosphor layer aligned with the radiation device in a first direction as recited in claim 13.

Shakuda discloses a device wherein the first contact layer is an elongate strip (under area 22, figure 9) having a length and a width, the length of the first contact layer aligned with the elongate phosphor strip as recited in claim 14.

Shakuda discloses a device wherein the second contact layer (electrode 21) is an elongate strip having a length and a width, the length of the second contact layer aligned with the radiation device in a second direction, wherein the second direction is perpendicular to the first direction (see figure 9) as recited in claim 15.

Shakuda disclose a device wherein the second contact layer (electrode 22) is positioned above the first contact layer (electrode 10) and separated therefrom by an insulating layer (insulation 18) as recited in claim 16.

With respect to claims 17 and 38, Shakuda discloses a device wherein the first contact layer (electrodes and metal layers) is formed from Au-Sn or Indium alloy yet fails to disclose a device wherein the first contact layer is formed from aluminum. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use aluminum as a first contact layer material since the examiner takes Official Notice of the equivalence of Aluminum and Au-Sn electrodes for their use in the LED art and the selection of any of these known equivalents to conduct electricity and reflect light would be within the level of ordinary skill in the art. 38

Shakuda discloses a visible light emitting device (figure 8) comprising a transparent substrate (sapphire substrate 3) a phosphor layer (InGaN:Zn) including one or more excitable visible light emitting phosphors, a radiation source (laminates 7) between the transparent substrate and the phosphor layer for providing radiation to excite visible light emission from the phosphor layer, the radiation source having a first contact region (electrode area 22, figure 9) and a second contact region (electrode area 21, figure 9) a first contact layer (metal layer 22) provided over at least part of the phosphor layer and reflecting at least some of the visible light emission from the phosphor layer back toward the transparent substrate, the first contact layer being electrically connected to the first contact region and a second contact layer (electrode

21) being electrically connected to the second contact region as specifically recited in claim 21. Wherein the phosphor layer includes a UV excitable visible light emitting phosphor (InGaN:Zn is a known blue and UV emitting phosphor) and the radiation source (laminate 7) is a UV radiation source as recited in claim 22.

With respect to claims 29 - 39, Shakuda discloses the claimed invention (as outlined above with respect to claims 4-20) except wherein the bottom portion of the radiation source corresponds to the first contact region of the radiation source (claim 29) or wherein the top portion of the radiation source corresponds to the second contact region of the radiation source (claim 31) or wherein the first contact layer is electrically connected to the bottom portion of the radiation source (claim 35) or wherein the second contact layer electrically connects to the top portion of the radiation source (claim 39). It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse the top and bottom contact regions, reverse the first and second contact layers and invert the radiation source, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

With respect to claims 40-43 Shakuda discloses a light emitting device as outlined with respect to claims 1-3, 4-20, 21-22 and 23-39 yet fails to disclose an array of such devices. It would have been obvious to one having ordinary skill in the art at

the time the invention was made to replicate the light emitting devices of Shakuda in an array fashion, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co, 193 USPQ 8.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mensz (U.S. 5,422,902), Mensz (U.S. 5,442,204), Vriens (U.S. 4,882,617) and Vriens (U.S. 4,822,144).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Gerike whose telephone number is (703) 308-8991. The examiner can normally be reached on Monday - Thursday from 7:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel, can be reached on (703) 305-4794. The fax phone number for this Group is (703) 305-3594.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Matthew J. Gerike
Patent Examiner
Art Unit 2879



ASHOK PATEL
PRIMARY EXAMINER